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(71) Applicant
RIV-SKF Officine Di Villar
Perosa S.p.A.,
Via Mazzini, 53, 10123
Torino, Italy
(72) Inventor
Salvatore Sassano
(74) Agent
Cruikshank and
Fairweather,
19 Royal Exchange
Square, Glasgow G1 3AE,
Scotland

(54) Pivotable Vehicle Rear View Mirror

(57) A pivotable vehicle rear view mirror has a light reflecting element (12) having a first and second operating positions, in which positions it forms, respectively, a first and a second angle of incidence relative to an identical incident luminous beam (20) coming from the rear of the said vehicle.

The beam 20 strikes a photosensitive transducer element (21) which is connected to processing means (22) which emits an output signal dependent on the intensity of the beam (20). An electromechanical transducer (31), which is supplied by the output signal, controls mechanically the displacement of the said light reflecting element (12) between the said first and the said second operating positions.

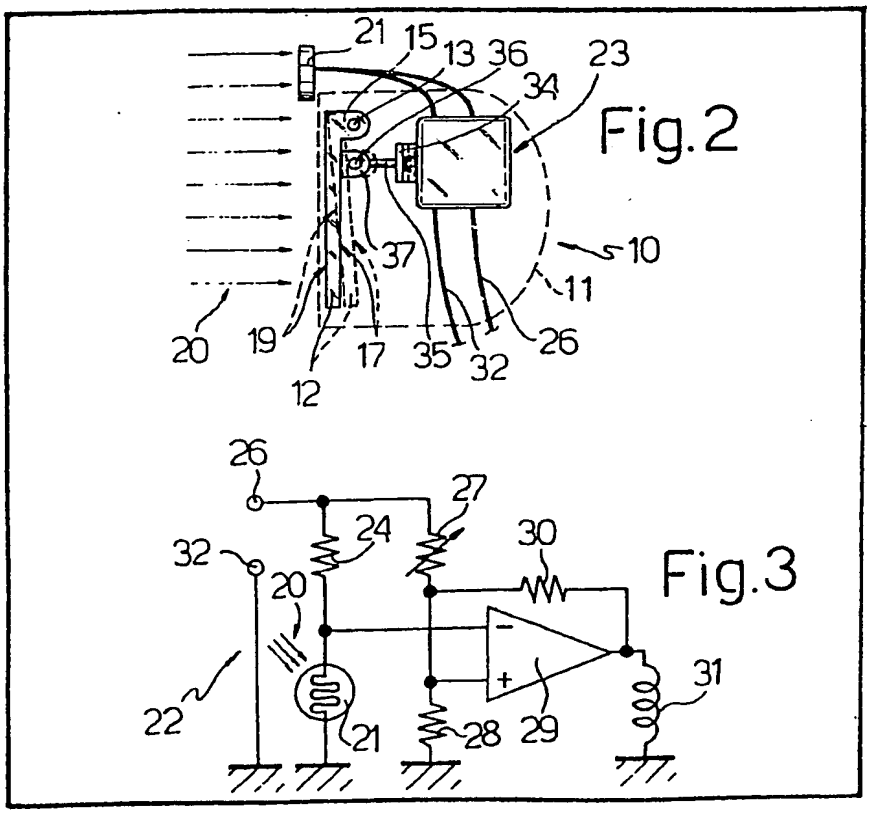

Fig.2

Fig.3

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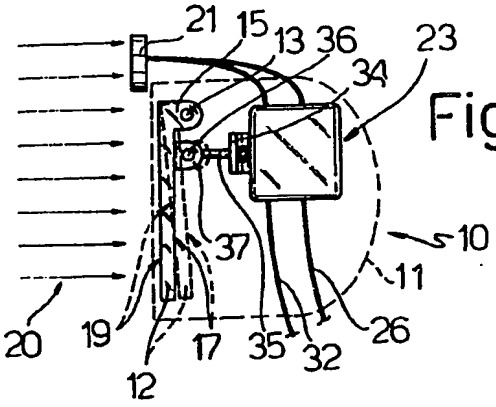

Fig.2

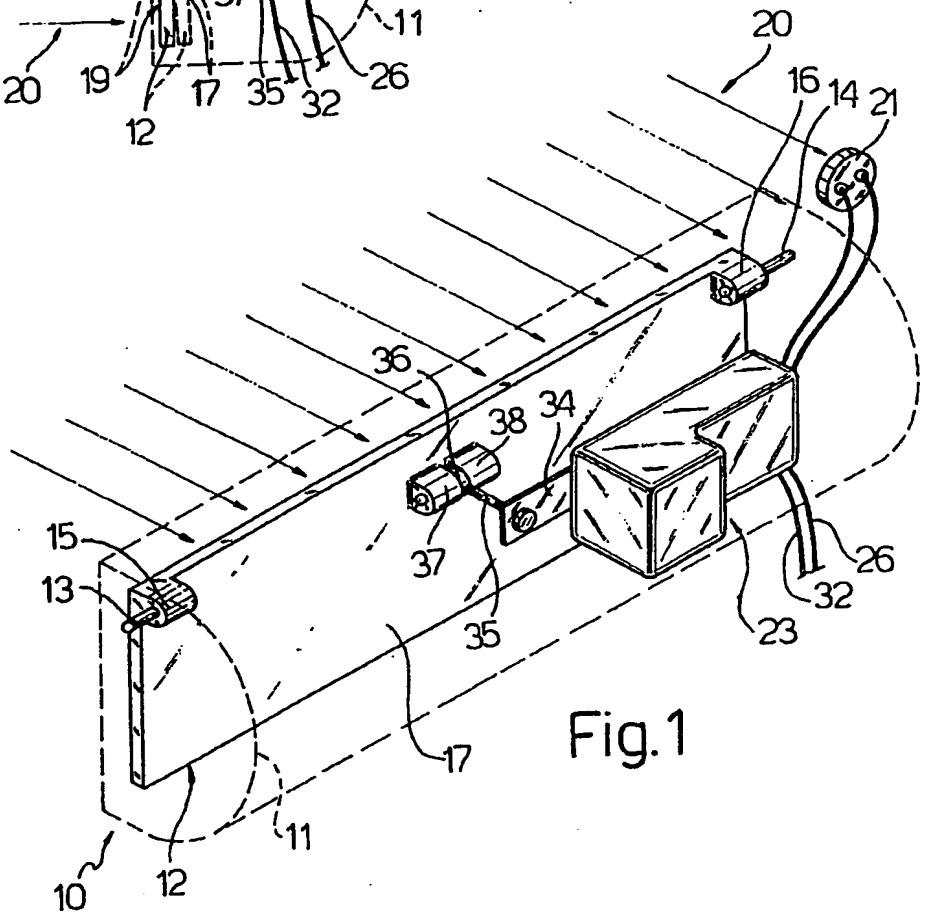

Fig.1

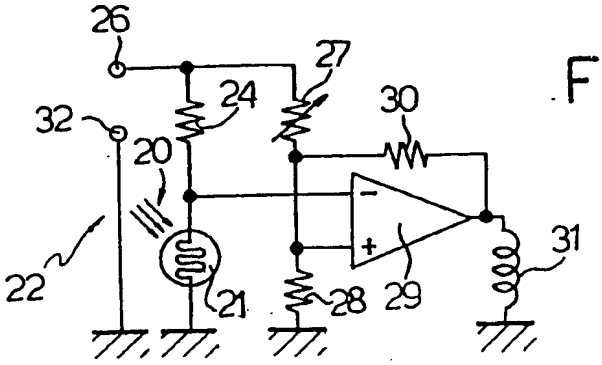

Fig.3

SPECIFICATION

Overturnable Rear View Mirror

The present invention relates to an overturnable rear view mirror.

As is known, rear view mirrors of the overturnable type are commonly used in motor vehicles, and preferably they are housed within the passenger compartment in a central position above the windshield. Their main characteristic consists in comprising an element which reflects the light and is arranged to assume at least a first or a second operating position, in which positions said element forms a first and a second angle of incidence, respectively, relative to a luminous beam coming from the rear part of the motor vehicle. Accordingly, the said reflecting element produces two different reflected luminous rays, respectively, which propagate in two different angularly offset directions. Assuming that in the first operating position the reflecting element allows the driver's eyes to perfectly frame the visual field accessible through the rear window, in the second operating position the said element diverts part of luminous rays coming from the exterior through the rear window. Therefore, especially when these luminous rays originate from the driving beams of vehicles which follow the vehicle in question, the positioning of the mirror in the second operating position prevents the driver from being vexed by an excessive light intensity.

The rear view mirrors of the specified type, although being widely used, have a serious disadvantage. In fact, as the movement between the two opposed operating positions has to be carried out by hand, the driver, besides being vexed by the intense light reflected by the mirror, is also compelled to take off one of his hands from the steering wheel to adjust the inclination of the mirror, thereby putting himself into a dangerous driving condition.

It is an object of the present invention to provide a rear view mirror of the overturnable type, which will be free from the described disadvantage of the known rear view mirrors of the same type.

This object is attained by the present invention which relates to an overturnable rear view mirror (10) arranged to be mounted in a vehicle and of the type formed by a light reflecting element (12) arranged to be brought into at least a first and a second operating position, in which positions it forms, respectively, a first and a second angle of incidence relative to the same incident luminous beam (20) coming from the rear part of the said motor vehicle, the rear view mirror according to the present invention being characterized in comprising at least a photosensitive transducer element (21) arranged to be struck by the said luminous beam (20); processing means (22) which are connected to the said photosensitive transducer element (21) and emit an output signal dependent on the intensity of the said luminous rays (20); and an electromechanical transducer (31) to which the output signal emitted by the processing means (22) is supplied, and which, as a function of the said output signal, controls mechanically the displacement of the said light reflecting element (12) between the said first and the said second operating position.

For a better understanding of the present invention a preferred embodiment thereof will now be described in detail, by way of non limiting example, with reference to the accompanying drawing, in which:

Figure 1 is a perspective top view of a rear view mirror according to the teachings of the present invention;

Figure 2 is a side view of the mirror shown in Figure 1; and

Figure 3 is a simplified wiring diagram of an electronic control circuit for the rear view mirror shown in Fig. 1.

Referring now in particular to Figures 1 and 2, reference numeral 10 indicates generally a rear view mirror arranged to be mounted in a motor vehicle. The mirror 10 is of the overturnable type and comprises substantially a body 11 (shown by dashed lines) which supports a light reflecting element 12. Element 12 is, in particular, rectangular in shape and is connected the body 11 by means of two pivots 13, 14 which extend from opposed portions at the ends of one of its major sides and are connected thereto by means of two projections 15, 16, respectively, which originate from the non reflecting rear face 17 of the element 12. Thus, the reflecting element 12 is mounted rotatably about an axis defined by the line which joins the pivots 13 and 14 and, as clearly shown in Fig. 2, it may assume a first or a second operating position, indicated by full and dashed lines, respectively. Finally, in Fig. 2 reference numeral 19 indicates a reflecting surface of the element 12, onto which surface there is incident a beam 20 of rays of light coming from the rear part of the motor vehicle in which the rear view mirror 10 is mounted.

According to the present invention, the rear view mirror 10 comprises a photosensitive transducer element (for example a photo-resistor) arranged to be struck by some rays of the beam 20, and a processing circuit indicated by reference numeral 22 in Fig. 3, housed in a container 23 (see Fig. 1) and rigidly connected, in a non visible way, to the support body 11.

The circuit shown in Fig. 3 is substantially a voltage comparator circuit with hysteresis, and comprises a first voltage divider formed by a resistor 24 and a photosensitive resistor 21 which are connected in series between a first feeder terminal 26 and the earth; a second voltage divider formed by an adjustable resistor 27 and a resistor 28 which also are connected in series between the terminal 26 and the earth; an operational amplifier 29 having an inverting input connected to the junction between the resistors 24 and 21, and a non inverting input connected to the junction between the resistors 27 and 28 and connected also, through a resistor 30, to an

output of the said amplifier 29; and a coil 31 connected between the output of the amplifier 29 and the earth. Circuit 22 is provided also with a second feeder terminal 32 connected to earth; terminals 26 and 32 are arranged to be connected to opposed poles of a continuous type supply source, such as an accumulator battery of the motor vehicle in which the rear view mirror 10 is mounted. The photosensitive resistor 21 (Fig. 2) is subjected to the light radiation of the beam 20.

The coil 31 is part of a relay (not shown) which is housed in the container 23 (Figures 1 and 2) and is provided with an armature 34 which projects from the container 23. The armature 34 carries at one end a bar 35 which in turn supports a pivot 36; this latter is mounted rotatably within a seating formed in two projections 37, 38 which extend from the surface 17 of the reflecting element 12 in an intermediate position between the projections 15 and 16 and at a pre-established distance from the line which joins the projections 15 and 26 to one another.

The operation of the rear view mirror 10 will now be described beginning with a description of the circuit 22 shown in Fig. 3. This latter substantially of a known type; in particular, at the output of the amplifier 29 there is present a "go high" or a "go low" signal, depending on the voltage at the inverting input being inferior or superior to the value assumed by the voltage at the non inverting input. The voltage supplied to the inverting input, referred to as "signal voltage", depends on the value assumed by the photosensitive resistor 21 and, accordingly, on the level of the luminous intensity of the incident beam 20. The voltage supplied to the non inverting input is called "treshold voltage" and, as is known, it assumes two distinct values, depending on the value assumed by the output signal of the amplifier 29 being "go high" or "go low", respectively. Such behaviour of the circuit 22, known as "hysteresis", allows to avoid having, for luminosity values for which the "signal voltage" fluctuates around the "treshold voltage", a continuous and undesirable energisation, deenergisation of the coil 31.

The said "go high" and "go low" signals coincide for example with the value of the voltages at the terminals 26 and 32, respectively; therefore, depending on the value of the light intensity which strikes the photosensitive resistor 21, the circuit 22 energizes or does not energize the coil 31.

Referring again to Figures 1 and 2, the energisation or the de-energisation of the coil 31 gives rise to the attraction of the release of the armature 34, resulting in in stable positioning of the reflecting element 12 of the mirror 10 in the one or the other configuration shown in Fig. 1.

From the analysis of the characteristics of the mirror 10 realised in accordance with the teachings of the present invention it can be noted that this mirror allows to overcome the disadvantage described hereinabove.

In fact, the correction of the angle of incidence of the mirror relative to the direction of the incident beam 20 coming from rear part of the vehicle is carried out, according to the present invention, in an entirely automatic way. Moreover, since the treshold value of the voltage of the circuit 22 is adjustable, each driver is in a position to carry out the displacement of the reflecting element 12 of the mirror 10 in the case of a beam 20 having a light intensity which the driver personally deems to be already annoying.

Finally, it is clear that many modifications and variations may be made to the mirror 10 of the present invention, without departing from the scope of the invention itself.

For example, the mirror 10 may be widely modified both in its mechanical part and in its electrical control part. Furthermore, the principle described hereinabove could advantageously be utilized for controlling the rear view mirror mounted outside the body of the motor vehicle.

Claims

1. An overtumable rear view mirror (10) arranged to be mounted in a vehicle and of the type formed by a light reflecting element (12) arranged to assume at least a first and a second operating position, in which positions it forms, respectively, a first and a second angle of incidence relative to an identical luminous beam (20 coming from the rear part of the said vehicle, characterized in that it comprises at least a photosensitive transducer element (21) arranged to be struck by the said luminous beam (20); processing means (22) connected to the said photosensitive transducer element (21) and which emit an output signal dependent on the intensity of the said luminous rays (20); and an electromechanical transducer (31) to which the output signal emitted by the said processing means is supplied and which, as a function of the said signal, controls mechanically the displacement of the said light reflecting element (12) between the said first and the said second operating position.

2. A mirror as claimed in Claim 1, characterized in that the said processing means are formed substantially by a treshold comparator circuit (22).

3. A mirror as claimed in Claim 2, characterized in that the said treshold comparator circuit comprises an operational amplifier (29) having a non inverting input, to which a reference voltage value is supplied, and an inverting input to which there is supplied a voltage signal generated by the said photosensitive transducer element (21) and dependent on the light intensity of the said luminous beam (20).

4. A mirror as claimed in Claim 3, characterized in comprising adjustment means (27) for adjusting the level of the said reference voltage.

5. A mirror as claimed in Claims 3 or 4, characterized in that the said treshold comparator circuit is of the type with hysteresis.

6. A mirror as claimed in at least one of the preceding Claims, characterized in that the said electromechanical transducer (31) is a relay, a coil (31) of which is connected to an output of the said processing means (22).

7. A mirror as claimed in Claim 6, characterized in that the said relay is provided with an armature (34) which is mechanically coupled to the said light reflecting element (12).

8. A mirror as claimed in Claim 7,characterized inthat the said reflecting element (12) is supported rotatably about an axis and that the said armature (34) is able to act onto the said reflecting element so as to make it assume the said first or second operating position, respectively, in the case in which the coil (31) of the said relay is energized or de-energized, respectively.

9. An overturnable rear view mirror, substantially as described hereinabove with reference to the annexed drawing.

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